

CLAIM AMENDMENTS

Amended claim: Claim 1-2, 4-9, 12-16, 19, and 20. Added new claims 21-22.

1. (Currently Amended) A method of installing a double ended distributed sensing optical fiber assembly within a guide conduit, the method comprising:

-providing a distributed sensing optical fiber assembly having a first elongate section with a first proximal end and a first distal end, and second elongate section with a second proximal end and a second distal end;

-providing a nose section, which interconnects the first proximal end to the second proximal end ~~proximal ends of two sections of distributed sensing fiber-optical cable~~ such that light transmitted along the length of one section of fiber optical cable is transmitted via the nose section into the other section of fiber optical cable;

-inserting the nose section into the guide conduit such that the nose section moves through the guide conduit ahead of said two sections of distributed sensing fiber optical cable that are interconnected thereby the first elongate section and second elongate section; and

-connecting the first distal end and second distal end ~~distal ends of the sections of distributed sensing fiber-optical cable~~ to a light transmission and receiving unit; and wherein the nose section has an outer width (W) which is less than 1 cm the nose section and the ~~two sections of distributed sensing fiber-optical cable interconnected thereby~~ first elongate section and the second elongate section are formed from a single fiber optical cable, which is bent into a U-shaped configuration in the a region of the nose section and the fiber optical cable is stretched in ~~said the region of the nose section~~ of the nose section such that the fiber optical cable has a smaller width in the region of the nose section than in most other parts of the fiber optical cable.

2. (Currently Amended) The method of claim 1, wherein the nose section has an outer width W which is less than about 5 mm and the guide conduit has an internal width which is less than about 10 mm.

3. (Original) The method of claim 1, wherein the fiber optical cable is heated when it is stretched and the bent section of stretched fiber optical cable is embedded in a nose-shaped body of material having a lower light reflection index than the stretched fiber optical cable embedded therein.

4. (Currently Amended) The method of claim 3, wherein said nose shaped body has a substantially cylindrical shape and an outer diameter less than about 3 mm.

5. (Currently Amended) A method of installing a double ended distributed sensing optical fiber assembly within a guide conduit, the method comprising:

- providing a nose section, which interconnects the proximal ends of two sections of distributed sensing fiber optical cable such that light transmitted along the length of one section of fiber optical cable is transmitted via the nose section into the other section of fiber optical cable;

- inserting the nose section into the guide conduit such that the nose section moves through the guide conduit ahead of said two sections of distributed sensing fiber optical cable that are interconnected thereby;

- connecting the distal ends of the sections of distributed sensing fiber optical cable to a light transmission and receiving unit; and

wherein the nose section has an outer width (W) which is less than 1 cm and the two sections of distributed sensing fiber optical cable are interconnected by a nose section which comprises a light reflecting element, such as a mirror, which is configured to transmit light emitted from a proximal end of one section of distributed sensing fiber optical cable into a proximal end of the other section of distributed sensing fiber optical cable.

6. (Currently Amended) The method of claim 5, wherein the nose section has an outer width W which is less than about 5 mm and the guide conduit has an internal width which is less than about 10 mm.

7. (Currently Amended) The method of ~~any preceding~~ claim 1, wherein the light transmitting and receiving unit is configured to transmit light pulses or pulsed and continuous waves alternatingly or simultaneously into the first distal end and the second distal end ~~each distal end of each of said two sections of distributed sensing fiber optical cable~~ and to acquire

distributed sensing data from light backscattered from different points along the length of the first elongate section and the second elongate section ~~two sections of fiber optical cable~~ to the distal end into which the light pulses are transmitted.

8. (Currently Amended) The method of claim 7, wherein the distributed sensing fiber optical assembly is configured as a distributed temperature ~~and/or distributed pressure~~ sensor assembly, and wherein each section of distributed sensing fiber optical cable passes through a reference region in which the fiber optical cable is exposed to a known temperature ~~and/or hydraulic pressure~~.

9. (Currently Amended) The method of claim 8, wherein said reference region is formed by a chamber in which the temperature ~~and pressure~~ are monitored, in which chamber a selected length of each section of distributed sensing optical fiber is coiled.

10. (Original) The method of claim 1, wherein the nose section and at least a substantial part of the distributed sensing fiber optical cables interconnected thereby are inserted into the guide conduit by pumping a fluid from one end towards another end of the guide conduit.

11. (Original) The method of claim 1, wherein the guide conduit is installed within or in the vicinity of an elongate fluid transfer flowline.

12. (Currently Amended) The method of claim 11, wherein the fluid transfer flowline is an underground inflow region of an oil ~~and/or~~ gas production well.

13. (Currently Amended) The method of claim 12, wherein the temperature ~~and/or~~ pressure of fluids flowing through at least part of an inflow region of an oil ~~and/or~~ gas production well are monitored by a distributed sensing fiber optical assembly and the method is used to monitor and/or control the production of oil ~~and/or~~ gas.

14. (Currently Amended) The method of claim 1, wherein at least substantial parts of the ~~two sections of the double-ended fiber optical cable~~ first elongate section and second elongate section are arranged side by side in a protective stainless steel tube, which preferably has an

outer diameter ~~outer diameter~~ (OD) from about 1 to about 3 mm, which tube is connected to a protective end cap in which the nose section is arranged and which tube is inserted into the guide conduit.

15. (Currently Amended) The method of claim 14, wherein a plurality of fiber optical sensing assemblies extend side by side through the protective stainless tube, which sensing assemblies monitor ~~different physical parameters such as~~ pressure, temperature and/or acoustic data and which are coupled to a series of flow, pressure, temperature, acoustic and/or seismic data monitoring assemblies.

16. (Currently Amended) The method of claim 1, wherein at least substantial parts of the ~~two sections of the double ended fiber optical cable~~ first elongate section and second elongate section are arranged side by side in a jacketed flexible protective tube, which is provided with a moulded end cap in which the nose section is arranged.

17. (Original) The method of claim 1, wherein the guide conduit has a substantially straight shape and is at a lower end thereof equipped with a check valve, such that when the double ended fiber and nose section are pumped into the guide conduit the pump fluid is discharged from the guide conduit through the check valve.

18. (Original) The method of claim 1, wherein the optical fiber assembly is inserted into the guide conduit which extends into a subsea well by means of a remotely operated subsea pod, which is removably mounted on a subsea wellhead.

19. (Currently Amended) The method of claim 14, wherein the protective stainless steel tube is arranged within a larger outer diameter OD stainless steel tube, such as a 1/4" about 6 mm outer diameter ~~[(6 mm OD)]~~ control.

20. (Currently Amended) The method of claim 1, wherein the guide tube is formed by the casing of an oil and/or gas production well and the double ended distributed sensing optical fiber assembly is strapped to the production tubing of the oil and/or gas production well, or otherwise inserted into the well.

21. (New) The method of claim 7, wherein the distributed sensing fiber optical assembly is configured as a distributed pressure sensor assembly; wherein each section of distributed sensing fiber optical cable passes through a reference region in which the fiber optical cable is exposed to a known hydraulic pressure.

22. (New) The method of claim 21, wherein the reference region is formed by a chamber in which the pressure is monitored, in which chamber a selected length of each section of distributed sensing optical fiber is coiled.